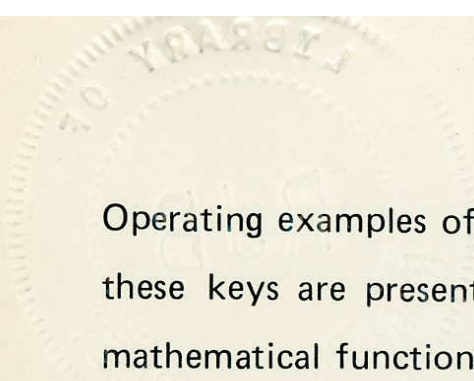


Application Guide and Operating Examples

SC-40 SCIENTIFIC CALCULATOR



Operating examples of the function keys of the SC-40 and very basic applications of these keys are presented in this booklet. Although there are hundreds of different mathematical functions used in various fields, it should be noted that your SC-40 can perform an almost infinite amount of different functions by combining the function keys in a specific sequence. Also, it should be noted that although it is not necessary, programing the sequence often simplifies the number of key operations to where less key operations are needed than as stated in the original problem. And the **factor reversal key** is very useful to reprogram the sequence back to its original form.

1. PROGRAMING AND REPROGRAMING SEQUENCE WITH THE X-Y KEY

Original Problems	Programing	Operations and Reprograming
$2 \div (3 + 7) = 0.2$	$(3 + 7) \div 2$	3 + 7 ÷ 2 X-Y = → 0.2
$2^{(3 + 7)} = 1024$	$(3 + 7)^2$	3 + 7 X^y 2 X-Y = → 1023.99...

2. ERROR CORRECTION

Revision to be Made	Desired Problems	Problems in Error	Operations in Error and Corrections
2nd factor	$2 + 3 =$	$2 + 5$	2 + 5 CE 3 =
Function	$2 + 3 =$	$2 \times$	2 X + 3 =
Both	$2 + 3 =$	2×5	2 X 5 CE + 3 =

Note: In the above examples, the first factor "2" should be regarded as such a valuable intermediate result of calculations that it may take a long time to reproduce it, if once cleared at all.

Revision to be Made	Desired Problems	Problems in Error	Operations in Error and Corrections
Sequence	$3 \div 2 =$	$2 \div 3$	$\boxed{2} \boxed{\div} \boxed{3} \boxed{\text{X-Y}} \boxed{=}$
1st factor	$3 \div 2 =$	$4 \div 2$	$\boxed{4} \boxed{\div} \boxed{2} \boxed{\text{X-Y}} \boxed{\text{CE}} \boxed{3} \boxed{\text{X-Y}} \boxed{=}$
Function	$3 \div 2 =$	3×2	$\boxed{3} \boxed{\times} \boxed{2} \boxed{\text{X-Y}} \boxed{\text{CE}} \boxed{\div} \boxed{3} \boxed{\text{X-Y}} \boxed{=}$

Note: In the above examples, the second factor "2" should be regarded as such a valuable result of intermediate calculations, developed in parenthesis and bracket pairs, that it may take a long time to reproduce it, if once cleared at all.

3. ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION

Problems	Operations	Displayed Results
$2 + 3 =$	$\boxed{2} \boxed{+} \boxed{3} \boxed{=}$	5.
$2 - 3 =$	$\boxed{2} \boxed{-} \boxed{3} \boxed{=}$	— 1.
$2 \times 3 =$	$\boxed{2} \boxed{\times} \boxed{3} \boxed{=}$	6.
$2 \div 3 =$	$\boxed{2} \boxed{\div} \boxed{3} \boxed{=}$	6.666666666—01

4. CALCULATIONS WITH NEGATIVE NUMBERS

Problems	Operations	Displayed Results
$(-2) + (-3) =$	$\boxed{+/-} \boxed{2} \boxed{+} \boxed{+/-} \boxed{3} \boxed{=}$	— 5.
$2 - (-3) =$	$\boxed{2} \boxed{-} \boxed{+/-} \boxed{3} \boxed{=}$	5.
$(-2) \times (-3) =$	$\boxed{+/-} \boxed{2} \boxed{\times} \boxed{+/-} \boxed{3} \boxed{=}$	6.
$2 \div (-3) =$	$\boxed{2} \boxed{\div} \boxed{+/-} \boxed{3} \boxed{=}$	-6.666666666-01

5. MIXED CHAIN CALCULATION

Problem:
$$\frac{[2 - (-3)] \times (-4) - (-5)}{-3} = 5$$

Operation: $\boxed{2} \boxed{-} \boxed{+/-} \boxed{3} \boxed{\times} \boxed{+/-} \boxed{4} \boxed{-} \boxed{+/-} \boxed{5} \boxed{\div} \boxed{+/-} \boxed{3} \boxed{=}$ 5.

In the above calculation, signs, numbers and functions are entered in the same sequence as the problem is stated since the **SC-40** uses **true sign/magnitude entry format**, and **true algebraic function notations**. Note: Up to this stage, use of the $\boxed{[(} \boxed{)]}$ keys are not needed.

6. CALCULATIONS WITH CONSTANT

Problems	Operations	Displayed Results
Set constant: 3	<input type="text" value="3"/> <input <="" input="" type="text" value="="/> <input type="text" value="M"/>	
$4 \times 3 =$	<input type="text" value="4"/> <input type="text" value="X"/> <input type="text" value="M"/> <input <="" input="" type="text" value="="/>	12.
$5 \times 3 =$	<input type="text" value="5"/> <input type="text" value="X"/> <input type="text" value="M"/> <input <="" input="" type="text" value="="/>	15.
$6 \times 3 =$	<input type="text" value="6"/> <input type="text" value="X"/> <input type="text" value="M"/> <input <="" input="" type="text" value="="/>	18.
Set constant: 2	<input type="text" value="2"/> <input <="" input="" type="text" value="="/> <input type="text" value="M"/>	
$10 \div 2 =$	<input type="text" value="1"/> <input type="text" value="0"/> <input type="text" value="÷"/> <input type="text" value="M"/> <input <="" input="" type="text" value="="/>	5.
$15 \div 2 =$	<input type="text" value="1"/> <input type="text" value="5"/> <input type="text" value="÷"/> <input type="text" value="M"/> <input <="" input="" type="text" value="="/>	7.5
$20 \div 2 =$	<input type="text" value="2"/> <input type="text" value="0"/> <input type="text" value="÷"/> <input type="text" value="M"/> <input <="" input="" type="text" value="="/>	10.
Set constant: 16	<input type="text" value="1"/> <input type="text" value="6"/> <input <="" input="" type="text" value="="/> <input type="text" value="M"/>	
$16 \div 2 =$	<input type="text" value="÷"/> <input type="text" value="2"/> <input <="" input="" type="text" value="="/>	8.
$16 \div 4 =$	<input type="text" value="C"/> <input type="text" value="M"/> <input type="text" value="÷"/> <input type="text" value="4"/> <input <="" input="" type="text" value="="/>	4.
$16 \div 8 =$	<input type="text" value="C"/> <input type="text" value="M"/> <input type="text" value="÷"/> <input type="text" value="8"/> <input <="" input="" type="text" value="="/>	2.

Set constant: 2

$7 + 2 =$

$2 = M$

$7 + M =$

9.

$8 + 2 =$

$8 + M =$

10.

$9 + 2 =$

$9 + M =$

11.

$7 - 2 =$

$7 - M =$

5.

$8 - 2 =$

$8 - M =$

6.

$9 - 2 =$

$9 - M =$

7.

Set constant: 7

$7 - 2 =$

$7 = M$

$- 2 =$

5.

$7 - 3 =$

$C M - 3 =$

4.

$7 - 4 =$

$C M - 4 =$

3.

7. CALCULATIONS WITH THE $[(]$ AND $[)]$ KEYS

SUM OF PRODUCTS—Problem: $(2 \times 3) + (3 \times 4) + (4 \times 5) = 38$

Operation: $[([2 \times 3)] + [([3 \times 4)] + [([4 \times 5)] =$

SUM OF QUOTIENTS—Problem: $(3 \div 2) + (5 \div 4) + (7 \div 2) = 6.25$

Operation: $[([3 \div 2)] + [([5 \div 4)] + [([7 \div 2)] =$

PRODUCT OF SUMS—Problem: $(1 + 2) \times (2 + 3) \times (3 + 4) = 105$

Operation: $[([1 + 2)] \times [([2 + 3)] \times [([3 + 4)] =$

PRODUCT OF DIFFERENCES—Problem: $(4 - 1) \times (5 - 2) \times (7 - 3) = 36$

Operation: $[([4 - 1)] \times [([5 - 2)] \times [([7 - 3)] =$

MIXED CALCULATIONS—Problem: $(2 \times 3) + (4 \div 5) \times (5 - 2) = 20.4$

Operation: $[([2 \times 3)] + [([4 \div 5)] \times [([5 - 2)] =$

MIXED CALCULATION WITH BOTH PARENTHESES AND BRACKETS

Problem: $[(2 \times 3) + (3 \div 4)] \div [(7 \times 5) - (5 \times 4)] = 0.45$

Operation: $\boxed{[(\boxed{2} \times \boxed{3})] + [(\boxed{3} \div \boxed{4})]) \div}$
 $\boxed{[(\boxed{7} \times \boxed{5}) - [(\boxed{5} \times \boxed{4})])] =$

Note: In the above calculations, parentheses and brackets are entered in the same sequence as the problems are written.

8. SUM OF SQUARES

Problems

$$a_1^2 + a_2^2 + a_3^2 + \dots + a_n^2$$

$$\sqrt{a_1^2 + a_2^2 + a_3^2 + \dots + a_n^2}$$

$$\frac{1}{\sqrt{a_1^2 + a_2^2 + a_3^2 + \dots + a_n^2}}$$

Operations

$$a_1 \boxed{X^2} \boxed{+} a_2 \boxed{X^2} \boxed{+} a_3 \boxed{X^2} \boxed{+} \dots a_n \boxed{X^2} \boxed{=}$$

Add the $\boxed{\sqrt{X}}$ key to the end of the above operation.

Further add the $\boxed{1/X}$ key to the end of the above.

9. SUM OF SQUARE ROOTS

Problems

$$\sqrt{a_1} + \sqrt{a_2} + \sqrt{a_3} + \dots + \sqrt{a_n}$$

Operations

$$a_1 \boxed{\sqrt{X}} \boxed{+} a_2 \boxed{\sqrt{X}} \boxed{+} a_3 \boxed{\sqrt{X}} \boxed{+} \dots a_n \boxed{\sqrt{X}} \boxed{=}$$

$$(\sqrt{a_1} + \sqrt{a_2} + \sqrt{a_3} + \dots + \sqrt{a_n})^2$$

Add the $\boxed{X^2}$ key to the end of the above operation.

$$\frac{1}{(\sqrt{a_1} + \sqrt{a_2} + \sqrt{a_3} + \dots + \sqrt{a_n})^2}$$

Further add the $\boxed{1/X}$ key to the end of the above.

10. SUM OF RECIPROCAL

Problems

$$1/a_1 + 1/a_2 + 1/a_3 + \dots + 1/a_n$$

Operations

$$a_1 \boxed{1/X} \boxed{+} a_2 \boxed{1/X} \boxed{+} a_3 \boxed{1/X} \boxed{+} \dots a_n \boxed{1/X} \boxed{=}$$

$$\frac{1}{\frac{1}{a_1} + \frac{1}{a_2} + \frac{1}{a_3} + \dots + \frac{1}{a_n}}$$

Add the $\boxed{1/X}$ key to the end of the above operation.

11. CALCULATIONS WITH THE $\boxed{X^2}$ KEY

Problems

Operations

a^2

$a \boxed{X^2}$

$a + b^2$

$a \boxed{+} b \boxed{X^2} \boxed{=}$

$a - b^2$

$a \boxed{-} b \boxed{X^2} \boxed{=}$

$a \times b^2$

$a \boxed{\times} b \boxed{X^2} \boxed{=}$

$a \div b^2$

$a \boxed{\div} b \boxed{X^2} \boxed{=}$

$a^2 + b^2$

$a \boxed{X^2} \boxed{+} b \boxed{X^2} \boxed{=}$

$a^2 - b^2$

$a \boxed{X^2} \boxed{-} b \boxed{X^2} \boxed{=}$

$a^2 \times b^2$

$a \boxed{X^2} \boxed{\times} b \boxed{X^2} \boxed{=}$

$a^2 \div b^2$

$a \boxed{X^2} \boxed{\div} b \boxed{X^2} \boxed{=}$

Problems

Operations

$(a + b)^2$

$a \boxed{+} b \boxed{=} \boxed{X^2}$

$(a - b)^2$

$a \boxed{-} b \boxed{=} \boxed{X^2}$

$(a \times b)^2$

$a \boxed{\times} b \boxed{=} \boxed{X^2}$

$(a \div b)^2$

$a \boxed{\div} b \boxed{=} \boxed{X^2}$

12. CALCULATIONS WITH THE $\sqrt{\text{X}}$ KEY

Problems

Operations

\sqrt{a}

$a \sqrt{\text{X}}$

$a + \sqrt{b}$

$a \boxed{+} b \sqrt{\text{X}} \boxed{=}$

$a - \sqrt{b}$

$a \boxed{-} b \sqrt{\text{X}} \boxed{=}$

$a \times \sqrt{b}$

$a \boxed{\times} b \sqrt{\text{X}} \boxed{=}$

$a \div \sqrt{b}$

$a \boxed{\div} b \sqrt{\text{X}} \boxed{=}$

$\sqrt{a} + \sqrt{b}$

$a \sqrt{\text{X}} \boxed{+} b \sqrt{\text{X}} \boxed{=}$

$\sqrt{a} - \sqrt{b}$

$a \sqrt{\text{X}} \boxed{-} b \sqrt{\text{X}} \boxed{=}$

$\sqrt{a} \times \sqrt{b}$

$a \sqrt{\text{X}} \boxed{\times} b \sqrt{\text{X}} \boxed{=}$

$\sqrt{a} \div \sqrt{b}$

$a \sqrt{\text{X}} \boxed{\div} b \sqrt{\text{X}} \boxed{=}$

Problems

Operations

$\sqrt{a + b}$

$a \boxed{+} b \boxed{= \sqrt{\text{X}}}$

$\sqrt{a - b}$

$a \boxed{-} b \boxed{= \sqrt{\text{X}}}$

$\sqrt{a \times b}$

$a \boxed{\times} b \boxed{= \sqrt{\text{X}}}$

$\sqrt{a \div b}$

$a \boxed{\div} b \boxed{= \sqrt{\text{X}}}$

13. CALCULATIONS WITH THE $\boxed{1/X}$ KEY

Problems

Operations

a^{-1}	a $\boxed{1/X}$
$a + b^{-1}$	a $\boxed{+}$ b $\boxed{1/X}$ $\boxed{=}$
$a - b^{-1}$	a $\boxed{-}$ b $\boxed{1/X}$ $\boxed{=}$
$a \times b^{-1}$	a $\boxed{\times}$ b $\boxed{1/X}$ $\boxed{=}$
$a \div b^{-1}$	a $\boxed{\div}$ b $\boxed{1/X}$ $\boxed{=}$
$a^{-1} + b^{-1}$	a $\boxed{1/X}$ $\boxed{+}$ b $\boxed{1/X}$ $\boxed{=}$
$a^{-1} - b^{-1}$	a $\boxed{1/X}$ $\boxed{-}$ b $\boxed{1/X}$ $\boxed{=}$
$a^{-1} \times b^{-1}$	a $\boxed{1/X}$ $\boxed{\times}$ b $\boxed{1/X}$ $\boxed{=}$
$a^{-1} \div b^{-1}$	a $\boxed{1/X}$ $\boxed{\div}$ b $\boxed{1/X}$ $\boxed{=}$

Problems

Operations

$(a + b)^{-1}$	a $\boxed{+}$ b $\boxed{=}$ $\boxed{1/X}$
$(a - b)^{-1}$	a $\boxed{-}$ b $\boxed{=}$ $\boxed{1/X}$
$(a \times b)^{-1}$	a $\boxed{\times}$ b $\boxed{=}$ $\boxed{1/X}$
$(a \div b)^{-1}$	a $\boxed{\div}$ b $\boxed{=}$ $\boxed{1/X}$

14. CALCULATIONS WITH THE X^y KEY

Problems

$$a^b$$

$$(a + b)^c$$

$$(a - b)^c$$

$$(a \times b)^c$$

$$(a \div b)^c$$

$$a + b^c$$

$$a - b^c$$

$$a \times b^c$$

$$a \div b^c$$

Operations

$$a \boxed{X^y} b \boxed{=}$$

$$a \boxed{+} b \boxed{X^y} c \boxed{=}$$

$$a \boxed{-} b \boxed{X^y} c \boxed{=}$$

$$a \boxed{\times} b \boxed{X^y} c \boxed{=}$$

$$a \boxed{\div} b \boxed{X^y} c \boxed{=}$$

$$a \boxed{+} \boxed{[(} b \boxed{X^y} c \boxed{)]} \boxed{=}$$

$$a \boxed{-} \boxed{[(} b \boxed{X^y} c \boxed{)]} \boxed{=}$$

$$a \boxed{\times} \boxed{[(} b \boxed{X^y} c \boxed{)]} \boxed{=}$$

$$a \boxed{\div} \boxed{[(} b \boxed{X^y} c \boxed{)]} \boxed{=}$$

Alternative Operations

$$\text{or } b \boxed{X^y} c \boxed{+} a \boxed{=}$$

$$\text{or } b \boxed{X^y} c \boxed{-} a \boxed{X-Y} \boxed{=}$$

$$\text{or } b \boxed{X^y} c \boxed{\times} a \boxed{=}$$

$$\text{or } b \boxed{X^y} c \boxed{\div} a \boxed{X-Y} \boxed{=}$$

$$a^{(b + c)} \quad a \boxed{X^y} \boxed{[(b \boxed{+} c \boxed{])}] \boxed{=}}$$

$$a^{(b - c)} \quad a \boxed{X^y} \boxed{[(b \boxed{-} c \boxed{])}] \boxed{=}}$$

$$a^{(b \times c)} \quad a \boxed{X^y} \boxed{[(b \boxed{\times} c \boxed{])}] \boxed{=}}$$

$$a^{(b \div c)} \quad a \boxed{X^y} \boxed{[(b \boxed{\div} c \boxed{])}] \boxed{=}}$$

$$\text{or } b \boxed{+} c \boxed{X^y} a \boxed{X-Y} \boxed{=}$$

$$\text{or } b \boxed{-} c \boxed{X^y} a \boxed{X-Y} \boxed{=}$$

$$\text{or } b \boxed{\times} c \boxed{X^y} a \boxed{X-Y} \boxed{=}$$

$$\text{or } b \boxed{\div} c \boxed{X^y} a \boxed{X-Y} \boxed{=}$$

$$a^b + c^d \quad a \boxed{X^y} b \boxed{+} \boxed{[(c \boxed{X^y} d \boxed{])}] \boxed{=}}$$

$$a^b - c^d \quad a \boxed{X^y} b \boxed{-} \boxed{[(c \boxed{X^y} d \boxed{])}] \boxed{=}}$$

$$a^b \times c^d \quad a \boxed{X^y} b \boxed{\times} \boxed{[(c \boxed{X^y} d \boxed{])}] \boxed{=}}$$

$$a^b \div c^d \quad a \boxed{X^y} b \boxed{\div} \boxed{[(c \boxed{X^y} d \boxed{])}] \boxed{=}}$$

15. Y-th ROOT OF $X - \sqrt[Y]{X}$

Problems

Operations

Alternative Operations

$$\sqrt[b]{a}$$

$$a \boxed{X^y} b \boxed{1/X} \boxed{=} \boxed{}$$

$$\sqrt[c]{a+b}$$

$$a \boxed{+} b \boxed{X^y} c \boxed{1/X} \boxed{=} \boxed{}$$

$$\sqrt[c]{a-b}$$

$$a \boxed{-} b \boxed{X^y} c \boxed{1/X} \boxed{=} \boxed{}$$

$$\sqrt[c]{a \times b}$$

$$a \boxed{\times} b \boxed{X^y} c \boxed{1/X} \boxed{=} \boxed{}$$

$$\sqrt[c]{a \div b}$$

$$a \boxed{\div} b \boxed{X^y} c \boxed{1/X} \boxed{=} \boxed{}$$

$$a + \sqrt[c]{b}$$

$$a \boxed{+} \boxed{[(} b \boxed{X^y} c \boxed{1/X} \boxed{)]} \boxed{=} \boxed{}$$

$$\text{or } b \boxed{X^y} c \boxed{1/X} \boxed{+} a \boxed{=} \boxed{}$$

$$a - \sqrt[c]{b}$$

$$a \boxed{-} \boxed{[(} b \boxed{X^y} c \boxed{1/X} \boxed{)]} \boxed{=} \boxed{}$$

$$\text{or } b \boxed{X^y} c \boxed{1/X} \boxed{-} a \boxed{X-Y} \boxed{=} \boxed{}$$

$$a \times \sqrt[c]{b}$$

$$a \boxed{\times} \boxed{[(} b \boxed{X^y} c \boxed{1/X} \boxed{)]} \boxed{=} \boxed{}$$

$$\text{or } b \boxed{X^y} c \boxed{1/X} \boxed{\times} a \boxed{=} \boxed{}$$

$$a \div \sqrt[c]{b}$$

$$a \boxed{\div} \boxed{[(} b \boxed{X^y} c \boxed{1/X} \boxed{)]} \boxed{=} \boxed{}$$

$$\text{or } b \boxed{X^y} c \boxed{1/X} \boxed{\div} a \boxed{X-Y} \boxed{=} \boxed{}$$

$(b + c)\sqrt[a]{}$	a <input type="text" value="X^y"/> [(<input type="text" value="b"/> + <input type="text" value="c"/>)] <input type="text" value="1/X"/> =	or b + c <input type="text" value="X^y"/> a <input type="text" value="X-Y"/> <input type="text" value="1/X"/> =
$(b - c)\sqrt[a]{}$	a <input type="text" value="X^y"/> [(<input type="text" value="b"/> - <input type="text" value="c"/>)] <input type="text" value="1/X"/> =	or b - c <input type="text" value="X^y"/> a <input type="text" value="X-Y"/> <input type="text" value="1/X"/> =
$(b \times c)\sqrt[a]{}$	a <input type="text" value="X^y"/> [(<input type="text" value="b"/> \times <input type="text" value="c"/>)] <input type="text" value="1/X"/> =	or b \times c <input type="text" value="X^y"/> a <input type="text" value="X-Y"/> <input type="text" value="1/X"/> =
$(b \div c)\sqrt[a]{}$	a <input type="text" value="X^y"/> [(<input type="text" value="b"/> \div <input type="text" value="c"/>)] <input type="text" value="1/X"/> =	or b \div c <input type="text" value="X^y"/> a <input type="text" value="X-Y"/> <input type="text" value="1/X"/> =

$\sqrt[b]{a} + \sqrt[d]{c}$	a <input type="text" value="X^y"/> b <input type="text" value="1/X"/> + [(<input type="text" value="c"/> <input type="text" value="X^y"/> d <input type="text" value="1/X"/>)] =
$\sqrt[b]{a} - \sqrt[d]{c}$	a <input type="text" value="X^y"/> b <input type="text" value="1/X"/> - [(<input type="text" value="c"/> <input type="text" value="X^y"/> d <input type="text" value="1/X"/>)] =
$\sqrt[b]{a} \times \sqrt[d]{c}$	a <input type="text" value="X^y"/> b <input type="text" value="1/X"/> \times [(<input type="text" value="c"/> <input type="text" value="X^y"/> d <input type="text" value="1/X"/>)] =
$\sqrt[b]{a} \div \sqrt[d]{c}$	a <input type="text" value="X^y"/> b <input type="text" value="1/X"/> \div [(<input type="text" value="c"/> <input type="text" value="X^y"/> d <input type="text" value="1/X"/>)] =

16. CALCULATIONS WITH THE e^x KEY

Problems

Operations

e^a

$a \boxed{e^x}$

$a + e^b$

$a \boxed{+} b \boxed{e^x} \boxed{=}$

$a - e^b$

$a \boxed{-} b \boxed{e^x} \boxed{=}$

$a \times e^b$

$a \boxed{\times} b \boxed{e^x} \boxed{=}$

$a \div e^b$

$a \boxed{\div} b \boxed{e^x} \boxed{=}$

$e^a + e^b$

$a \boxed{e^x} \boxed{+} b \boxed{e^x} \boxed{=}$

$e^a - e^b$

$a \boxed{e^x} \boxed{-} b \boxed{e^x} \boxed{=}$

$e^a \times e^b$

$a \boxed{e^x} \boxed{\times} b \boxed{e^x} \boxed{=}$

$e^a \div e^b$

$a \boxed{e^x} \boxed{\div} b \boxed{e^x} \boxed{=}$

Problems

Operations

$e(a + b)$

$a \boxed{+} b \boxed{=} \boxed{e^x}$

$e(a - b)$

$a \boxed{-} b \boxed{=} \boxed{e^x}$

$e(a \times b)$

$a \boxed{\times} b \boxed{=} \boxed{e^x}$

$e(a \div b)$

$a \boxed{\div} b \boxed{=} \boxed{e^x}$

17. HYPERBOLIC FUNCTIONS

Problems

$$\sinh a = \frac{e^a - e^{-a}}{2}$$

$$\cosh a = \frac{e^a + e^{-a}}{2}$$

$$\tanh a = \frac{e^a - e^{-a}}{e^a + e^{-a}}$$

Operations

$$a \quad [e^x] \quad [=] \quad [M] \quad [-] \quad [M] \quad [1/X] \quad [\div] \quad [2] \quad [=]$$

$$a \quad [e^x] \quad [=] \quad [M] \quad [+] \quad [M] \quad [1/X] \quad [\div] \quad [2] \quad [=]$$

$$a \quad [e^x] \quad [=] \quad [M] \quad [-] \quad [M] \quad [1/X] \quad [\div] \quad [(] \quad [M] \quad [+] \quad [M] \quad [1/X] \quad [)] \quad [=]$$

The $[1/X]$ key added to the end of each above operation gives cosech a , sech a , and coth a , respectively.

18. CALCULATIONS WITH THE $\ln X$ AND $\log X$ KEYS

Problems

Operations

$\ln a$

$a \quad \boxed{\ln X}$

$a + \ln b$

$a \quad \boxed{+} \quad b \quad \boxed{\ln X} \quad \boxed{=}$

$a - \ln b$

$a \quad \boxed{-} \quad b \quad \boxed{\ln X} \quad \boxed{=}$

$a \times \ln b$

$a \quad \boxed{\times} \quad b \quad \boxed{\ln X} \quad \boxed{=}$

$a \div \ln b$

$a \quad \boxed{\div} \quad b \quad \boxed{\ln X} \quad \boxed{=}$

$\ln (a + b)$

$a \quad \boxed{+} \quad b \quad \boxed{=} \quad \boxed{\ln X}$

$\ln (a - b)$

$a \quad \boxed{-} \quad b \quad \boxed{=} \quad \boxed{\ln X}$

$\ln (a \times b)$

$a \quad \boxed{\times} \quad b \quad \boxed{=} \quad \boxed{\ln X}$

$\ln (a \div b)$

$a \quad \boxed{\div} \quad b \quad \boxed{=} \quad \boxed{\ln X}$

Problems

Operations

$\log a$

$a \quad \boxed{\log X}$

$a + \log b$

$a \quad \boxed{+} \quad b \quad \boxed{\log X} \quad \boxed{=}$

$a - \log b$

$a \quad \boxed{-} \quad b \quad \boxed{\log X} \quad \boxed{=}$

$a \times \log b$

$a \quad \boxed{\times} \quad b \quad \boxed{\log X} \quad \boxed{=}$

$a \div \log b$

$a \quad \boxed{\div} \quad b \quad \boxed{\log X} \quad \boxed{=}$

$\log (a + b)$

$a \quad \boxed{+} \quad b \quad \boxed{=} \quad \boxed{\log X}$

$\log (a - b)$

$a \quad \boxed{-} \quad b \quad \boxed{=} \quad \boxed{\log X}$

$\log (a \times b)$

$a \quad \boxed{\times} \quad b \quad \boxed{=} \quad \boxed{\log X}$

$\log (a \div b)$

$a \quad \boxed{\div} \quad b \quad \boxed{=} \quad \boxed{\log X}$

$$\ln a + \ln b \quad a \boxed{\ln X} \boxed{+} b \boxed{\ln X} \boxed{=}$$

$$\ln a - \ln b \quad a \boxed{\ln X} \boxed{-} b \boxed{\ln X} \boxed{=}$$

$$\ln a \times \ln b \quad a \boxed{\ln X} \boxed{\times} b \boxed{\ln X} \boxed{=}$$

$$\ln a \div \ln b \quad a \boxed{\ln X} \boxed{\div} b \boxed{\ln X} \boxed{=}$$

$$\log a + \log b \quad a \boxed{\log X} \boxed{+} b \boxed{\log X} \boxed{=}$$

$$\log a - \log b \quad a \boxed{\log X} \boxed{-} b \boxed{\log X} \boxed{=}$$

$$\log a \times \log b \quad a \boxed{\log X} \boxed{\times} b \boxed{\log X} \boxed{=}$$

$$\log a \div \log b \quad a \boxed{\log X} \boxed{\div} b \boxed{\log X} \boxed{=}$$

19. $\log_x Y$ AND $\log_2 X$ FUNCTIONS

Problem

Operation

$$\log_a b \quad b \boxed{\ln X} \boxed{\div} a \boxed{\ln X} \boxed{=}$$

Problem

Operation

$$\log_2 a \quad a \boxed{\ln X} \boxed{\div} 2 \boxed{\ln X} \boxed{=}$$

20. CALCULATIONS WITH THE sin AND arc KEYS

Problems

Operations

$\sin a$

$a \text{ sin }$

$a + \sin b$

$a \text{ + } b \text{ sin = }$

$a - \sin b$

$a \text{ - } b \text{ sin = }$

$a \times \sin b$

$a \text{ \times } b \text{ sin = }$

$a \div \sin b$

$a \text{ \div } b \text{ sin = }$

$\sin (a + b)$

$a \text{ + } b \text{ = sin }$

$\sin (a - b)$

$a \text{ - } b \text{ = sin }$

$\sin (a \times b)$

$a \text{ \times } b \text{ = sin }$

$\sin (a \div b)$

$a \text{ \div } b \text{ = sin }$

Problems

Operations

$\sin^{-1} a$

$a \text{ arc sin }$

$a + \sin^{-1} b$

$a \text{ + } b \text{ arc sin = }$

$a - \sin^{-1} b$

$a \text{ - } b \text{ arc sin = }$

$a \times \sin^{-1} b$

$a \text{ \times } b \text{ arc sin = }$

$a \div \sin^{-1} b$

$a \text{ \div } b \text{ arc sin = }$

$\sin^{-1} (a + b)$

$a \text{ + } b \text{ = arc sin }$

$\sin^{-1} (a - b)$

$a \text{ - } b \text{ = arc sin }$

$\sin^{-1} (a \times b)$

$a \text{ \times } b \text{ = arc sin }$

$\sin^{-1} (a \div b)$

$a \text{ \div } b \text{ = arc sin }$

$$\sin a + \sin b \quad a \boxed{\sin} \boxed{+} b \boxed{\sin} \boxed{=}$$

$$\sin a - \sin b \quad a \boxed{\sin} \boxed{-} b \boxed{\sin} \boxed{=}$$

$$\sin a \times \sin b \quad a \boxed{\sin} \boxed{\times} b \boxed{\sin} \boxed{=}$$

$$\sin a \div \sin b \quad a \boxed{\sin} \boxed{\div} b \boxed{\sin} \boxed{=}$$

$$\sin^{-1} a + \sin^{-1} b \quad a \boxed{\arcsin} \boxed{+} b \boxed{\arcsin} \boxed{=}$$

$$\sin^{-1} a - \sin^{-1} b \quad a \boxed{\arcsin} \boxed{-} b \boxed{\arcsin} \boxed{=}$$

$$\sin^{-1} a \times \sin^{-1} b \quad a \boxed{\arcsin} \boxed{\times} b \boxed{\arcsin} \boxed{=}$$

$$\sin^{-1} a \div \sin^{-1} b \quad a \boxed{\arcsin} \boxed{\div} b \boxed{\arcsin} \boxed{=}$$

21. CALCULATIONS WITH THE $\boxed{\cos}$ AND $\boxed{\arcsin}$ KEYS

Problems

Operations

$$\cos a \quad a \boxed{\cos}$$

$$a + \cos b \quad a \boxed{+} b \boxed{\cos} \boxed{=}$$

$$a - \cos b \quad a \boxed{-} b \boxed{\cos} \boxed{=}$$

$$a \times \cos b \quad a \boxed{\times} b \boxed{\cos} \boxed{=}$$

$$a \div \cos b \quad a \boxed{\div} b \boxed{\cos} \boxed{=}$$

Problems

Operations

$$\cos^{-1} a \quad a \boxed{\arccos}$$

$$a + \cos^{-1} b \quad a \boxed{+} b \boxed{\arccos} \boxed{=}$$

$$a - \cos^{-1} b \quad a \boxed{-} b \boxed{\arccos} \boxed{=}$$

$$a \times \cos^{-1} b \quad a \boxed{\times} b \boxed{\arccos} \boxed{=}$$

$$a \div \cos^{-1} b \quad a \boxed{\div} b \boxed{\arccos} \boxed{=}$$

$$\cos(a + b) \quad a \boxed{+} b \boxed{=} \boxed{\cos}$$

$$\cos(a - b) \quad a \boxed{-} b \boxed{=} \boxed{\cos}$$

$$\cos(a \times b) \quad a \boxed{\times} b \boxed{=} \boxed{\cos}$$

$$\cos(a \div b) \quad a \boxed{\div} b \boxed{=} \boxed{\cos}$$

$$\cos^{-1}(a + b) \quad a \boxed{+} b \boxed{=} \boxed{\arccos}$$

$$\cos^{-1}(a - b) \quad a \boxed{-} b \boxed{=} \boxed{\arccos}$$

$$\cos^{-1}(a \times b) \quad a \boxed{\times} b \boxed{=} \boxed{\arccos}$$

$$\cos^{-1}(a \div b) \quad a \boxed{\div} b \boxed{=} \boxed{\arccos}$$

$$\cos a + \cos b \quad a \boxed{\cos} \boxed{+} b \boxed{\cos} \boxed{=}$$

$$\cos a - \cos b \quad a \boxed{\cos} \boxed{-} b \boxed{\cos} \boxed{=}$$

$$\cos a \times \cos b \quad a \boxed{\cos} \boxed{\times} b \boxed{\cos} \boxed{=}$$

$$\cos a \div \cos b \quad a \boxed{\cos} \boxed{\div} b \boxed{\cos} \boxed{=}$$

$$\cos^{-1} a + \cos^{-1} b \quad a \boxed{\arccos} \boxed{+} b \boxed{\arccos} \boxed{=}$$

$$\cos^{-1} a - \cos^{-1} b \quad a \boxed{\arccos} \boxed{-} b \boxed{\arccos} \boxed{=}$$

$$\cos^{-1} a \times \cos^{-1} b \quad a \boxed{\arccos} \boxed{\times} b \boxed{\arccos} \boxed{=}$$

$$\cos^{-1} a \div \cos^{-1} b \quad a \boxed{\arccos} \boxed{\div} b \boxed{\arccos} \boxed{=}$$

22. CALCULATIONS WITH THE tan AND arc KEYS

Problems

Operations

$\tan a$

a tan

$a + \tan b$

a + b tan =

$a - \tan b$

a - b tan =

$a \times \tan b$

a × b tan =

$a \div \tan b$

a ÷ b tan =

$\tan (a + b)$

a + b = tan

$\tan (a - b)$

a - b = tan

$\tan (a \times b)$

a × b = tan

$\tan (a \div b)$

a ÷ b = tan

Problems

Operations

$\tan^{-1} a$

a arc tan

$a + \tan^{-1} b$

a + b arc tan =

$a - \tan^{-1} b$

a - b arc tan =

$a \times \tan^{-1} b$

a × b arc tan =

$a \div \tan^{-1} b$

a ÷ b arc tan =

$\tan^{-1} (a + b)$

a + b = arc tan

$\tan^{-1} (a - b)$

a - b = arc tan

$\tan^{-1} (a \times b)$

a × b = arc tan

$\tan^{-1} (a \div b)$

a ÷ b = arc tan

$\tan a + \tan b$	a <input type="text" value="tan"/> <input type="text" value="+"/> b <input type="text" value="tan"/> <input <="" input="" type="text" value="="/>	$\tan^{-1} a + \tan^{-1} b$	a <input type="text" value="arc"/> <input type="text" value="tan"/> <input type="text" value="+"/> b <input type="text" value="arc"/> <input type="text" value="tan"/> <input <="" input="" type="text" value="="/>
$\tan a - \tan b$	a <input type="text" value="tan"/> <input type="text" value="-"/> b <input type="text" value="tan"/> <input <="" input="" type="text" value="="/>	$\tan^{-1} a - \tan^{-1} b$	a <input type="text" value="arc"/> <input type="text" value="tan"/> <input type="text" value="-"/> b <input type="text" value="arc"/> <input type="text" value="tan"/> <input <="" input="" type="text" value="="/>
$\tan a \times \tan b$	a <input type="text" value="tan"/> <input type="text" value="X"/> b <input type="text" value="tan"/> <input <="" input="" type="text" value="="/>	$\tan^{-1} a \times \tan^{-1} b$	a <input type="text" value="arc"/> <input type="text" value="tan"/> <input type="text" value="X"/> b <input type="text" value="arc"/> <input type="text" value="tan"/> <input <="" input="" type="text" value="="/>
$\tan a \div \tan b$	a <input type="text" value="tan"/> <input type="text" value="÷"/> b <input type="text" value="tan"/> <input <="" input="" type="text" value="="/>	$\tan^{-1} a \div \tan^{-1} b$	a <input type="text" value="arc"/> <input type="text" value="tan"/> <input type="text" value="÷"/> b <input type="text" value="arc"/> <input type="text" value="tan"/> <input <="" input="" type="text" value="="/>

23. SPECIAL CONDITIONS OF THE SC-40

RESULT OVERFLOW

DISPLAY

<input type="text" value="2"/> <input type="text" value="X²"/> <input type="text" value="X²"/> <input type="text" value="X²"/> - - - to the 8th <input type="text" value="X²"/> :	→	1.157920892	77
the 9th <input type="text" value="X²"/> :	→ <input type="text" value="┐"/>	1.340780792	54

The correct answer is:

1.340780792 154

1 exp +/- 9 9 ÷ +/- 9 exp 9 9 : —————→ F 1.111111111 - 99

The correct answer is: —————→ - 1.111111111 -199

9 • 9 9 9 9 9 9 9 9 9 9 exp 9 9 1/X : —————→ 1. - 00

The correct answer is: —————→ 1. -100

ERROR DUE TO ILLEGAL ENTRY

9 9 • 9 9 9 9 9 9 9 9 9 exp 9 9 : —————→ 99.99999999 99

Proceeding to any function key causes: —————→ 0.

ERROR DUE TO PROHIBITED INPUT ARGUMENT

0 1/X , 1 ÷ 0 = , or +/- 2 √X : —————→ 0.

9 0 tan , +/- 2 lnX , or 2 X^y 3 3 3 = : —————→ 0.

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